

AMENDMENTS TO THE CLAIMS

1. (currently amended) A method of stimulating osteoblast differentiation and bone formation *in vitro* in an individual, comprising the step of:

over-expressing in osteoblast precursor cells Smad1 which mediates signaling of bone morphogenetic protein (BMP), wherein said Smad1 interacts with Hoxc-8 protein and inhibits the binding of said Hoxc-8 protein to a BMP-responsive gene encoding a bone matrix protein, thereby stimulating osteoblast differentiation and bone formation. inducing an interaction between Smad1 and a homeobox-containing transcription factor, wherein said interaction induces a BMP-responsive gene encoding a bone matrix protein which produces osteoblast and/or chondroblast differentiation thereby stimulating bone formation.

2-3. (canceled)

4. (currently amended) The method of claim 1, wherein said BMP-responsive gene is selected from the group consisting of osteopontin[[],] sialoprotein, osteonectin, and osteocalcin.

5. (canceled)

6. (withdrawn) A method of inducing gene(s) encoding bone matrix proteins, comprising the step of:

inducing an interaction between Smad1 and a homeobox-containing transcription factor, wherein said interaction results in an induction of gene(s) encoding bone matrix proteins.

7. (canceled)

8. (withdrawn) The method of claim 10, wherein said interaction is induced by means selected from the group consisting of phosphorylation of Smad1, over-expression of Smad1, and mutation of said homeobox-containing transcription factor.

9-12. (canceled)

13. (withdrawn) A method of regulating disease in an individual, comprising the step of:

inhibiting the binding of a homeobox-containing transcription factor to a gene involved in regulating disease in cells of said individual, wherein inhibition of binding removes transcriptional repression by the homeobox-containing protein of said gene, thereby resulting in the induction of said genes involved in regulating disease.

14. (withdrawn) The method of claim 13, wherein said inhibition is due to the presence of a compound that binds to the homeobox-containing transcription factor, thereby inhibiting the DNA binding ability of said homeobox-containing transcription factor.

15. (withdrawn) The method of claim 13, wherein said compound is selected from the group consisting of an antibody or fragment thereof, synthetic drugs, synthetic proteins and a phosphorylated form of Smad1 or fragments thereof.

16. (withdrawn) The method of claim 13, wherein said homeobox-containing transcription factor is selected from the group consisting of Hoxc-8, Hoxa-9, Msx1, and Msx2.

17. (withdrawn) The method of claim 13, wherein said individual has a disease selected from the group consisting of osteoporosis, cancer, cardiovascular disease and neurological disease.